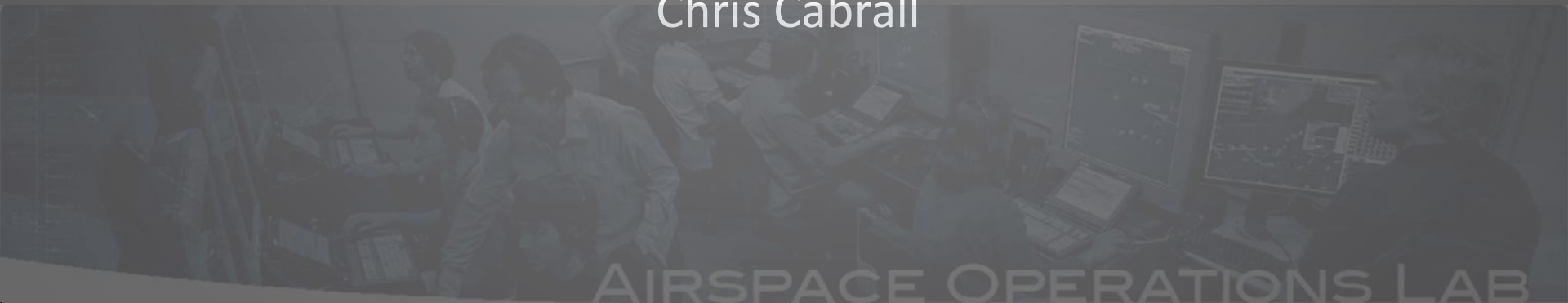


How to Prepare and Run a Simulation

Michael Kupfer

Joey Mercer

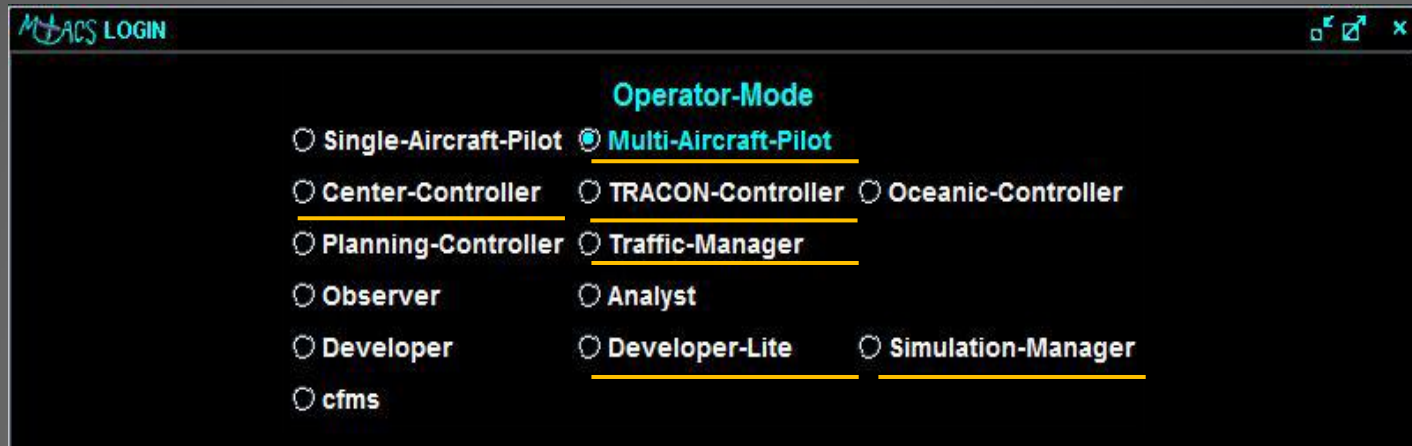
Chris Cabrall



Outline

- Operator modes
- Scenario Control “running a simulation”
- Flightdeck
- STARS display (What are its features and functions \leftrightarrow how did we get them)
 - Airspace adaptation “scope”
 - Configuring the controller’s workstation (What can be seen? Basic features, various commands)
 - ATC DST configuration
 - STARS / DSR PlanView setup
 - Datablocks and waypoints
 - CMS tools
- DSR display
 - What can be seen on the radar display
 - ATC procedures
- Scenario/Weather Editing
- Data collection
- Q&A

Choosing the Operator Mode

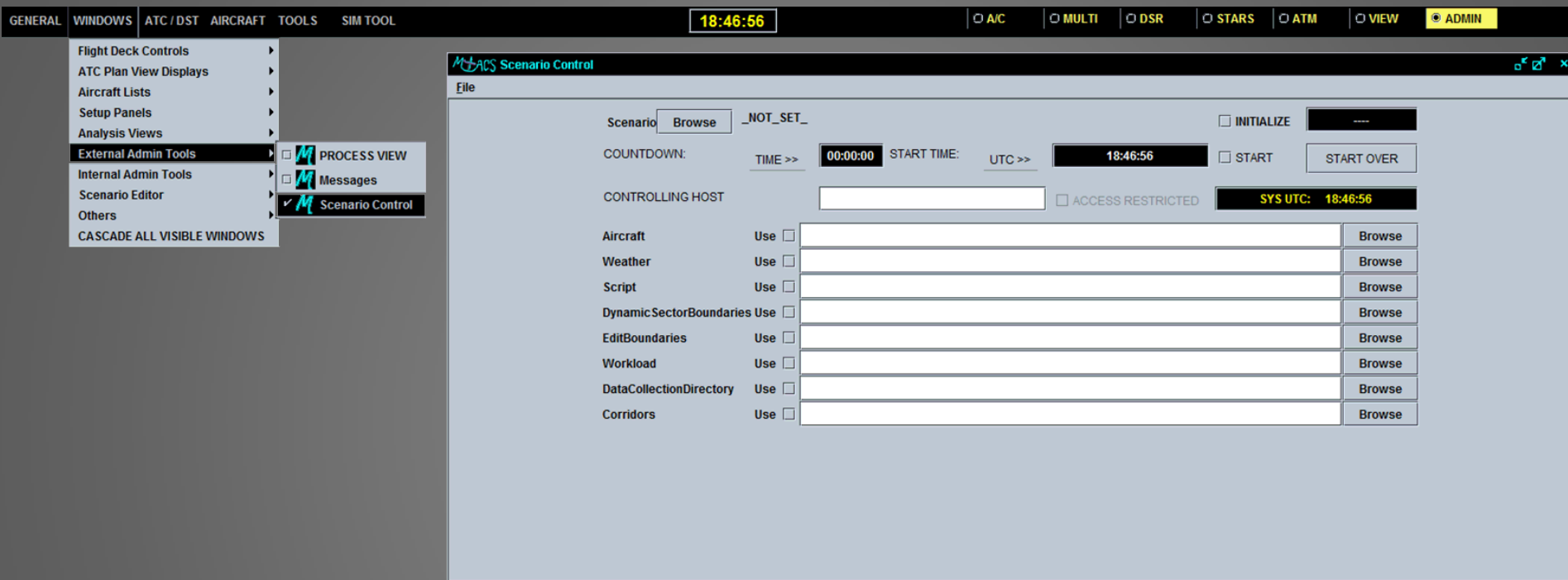


CA1:

- **Simulation Manager** (simulation control)
- **TRACON Controller** (sectors 258, 264, ...)
- **Center-controller** (sectors 24, 25, 75, and ghost station)
- **Multi-Aircraft Pilot**
- **Traffic Manager** (additional views for wall projection)
- **Developer Lite, Observer** (researcher stations)

More information under: <https://aol1.arc.nasa.gov:8443/display/macs/Getting+started+with+MACS>

Scenario Control Interface



Scenario Control

- Scenario bundles are created and loaded through the Scenario Control interface
- Scenario Control also used for starting and stopping simulation runs

Scenario Control Interface

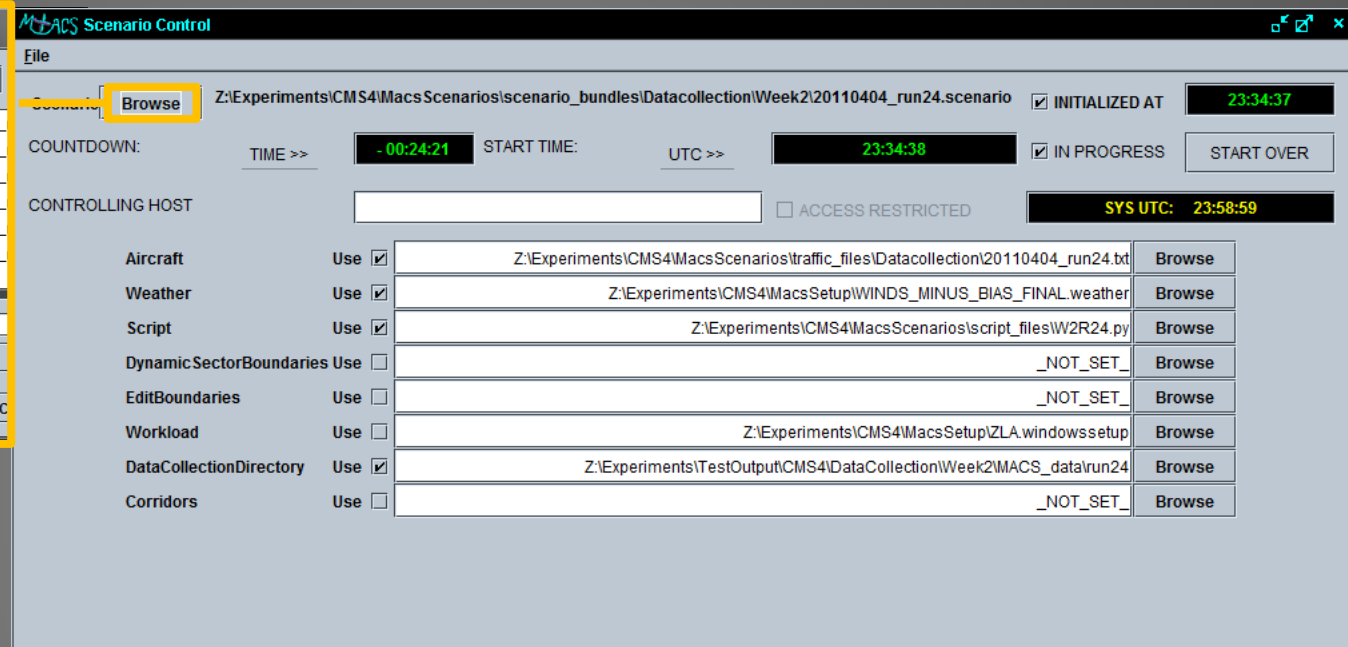
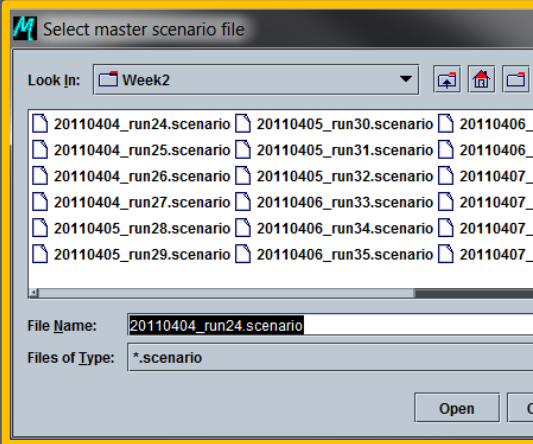
The screenshot shows the MTTACS Scenario Control window. At the top, there's a title bar with the MTTACS logo and the text 'Scenario Control'. Below the title bar is a menu bar with 'File'. The main interface is divided into several sections:

- Scenario:** A dropdown menu showing '_NOT_SET_' with a 'Browse' button next to it.
- INITIALIZE:** A checkbox and a button labeled '----'.
- COUNTDOWN:** A label followed by 'TIME >>' and a digital display showing '00:00:00'.
- START TIME:** A label followed by 'UTC >>' and a digital display showing '18:46:56'.
- START:** A checkbox and a button labeled 'START OVER'.
- CONTROLLING HOST:** A text input field and a checkbox labeled 'ACCESS RESTRICTED'.
- SYS UTC:** A digital display showing '18:46:56'.
- Configuration List:** A table with columns for a category, a 'Use' checkbox, a description, and a 'Browse' button.

Category	Use	Description	Browser
Aircraft	<input type="checkbox"/>	Scenario traffic file (.txt)	Browse
Weather	<input type="checkbox"/>	.weather file	Browse
Script	<input type="checkbox"/>	Python file (.py) used for scripted simulation events	Browse
DynamicSectorBoundaries	<input type="checkbox"/>	Scripted sector boundaries (.txt)	Browse
EditBoundaries	<input type="checkbox"/>	Set of editable sector boundaries (.txt)	Browse
Workload	<input type="checkbox"/>	Workload prompt setup file (.windowssetup)	Browse
DataCollectionDirectory	<input type="checkbox"/>	Where data will be written	Browse
Corridors	<input type="checkbox"/>	Corridor definition file	Browse

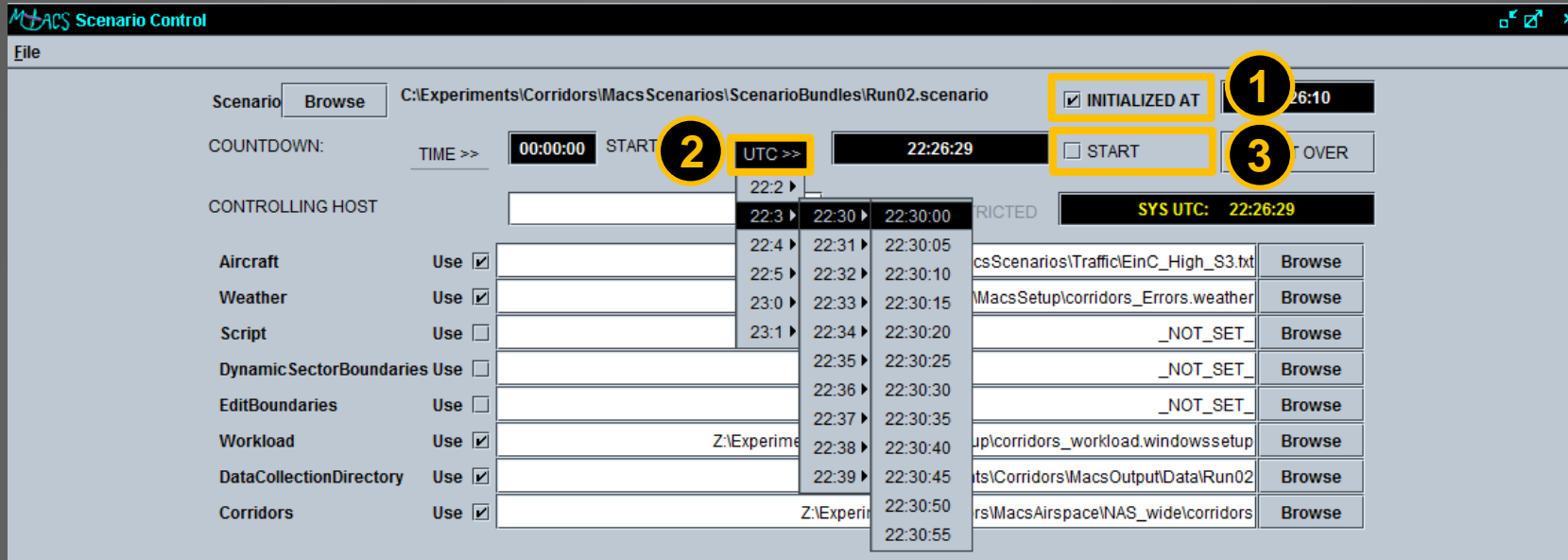
- Dependencies exist between local settings and the scenario bundle
- “Use” boxes must be checked for associated file to be distributed
 - If not, whatever is defined in a position’s master configuration file will be loaded
- When including convective weather, make sure proper path for .xml file is defined in the weather setup file’s “Wx Selection” tab and checkbox is checked
- Ensure ADRSs are collecting data (if desired)

Scenario Control Interface



- Bundles can be loaded through the File menu or Browse portal (as shown)
- Ensure settings are correct. If ANY changes are made, make sure file is saved

Scenario Control Interface



1. Check the “INITIALIZED AT” box to begin startup process
2. Select a desired and realistic start time through the “UTC” flyout menus
3. Check the “START” box to distribute the bundle
4. A countdown will begin in the “TIME” window

Example Stations: Pseudo Pilot Station

MACS-AOL-2012-1-5 Developer-Lite : Michael Pilot-Config: plan_b(Enabled) ATC-Sector: ZFW_269(Enabled) ADRS: morrell.arc.nasa.gov (offline) 35 flights

MACS ABOUT GENERAL WINDOWS ATC/DST AIRCRAFT TOOLS SIM TOOL 02:39:31 A/C MULTI DSR STARS ATM VIEW ADMIN

MACS ACTIV... **MACS CTRL...** **MACS AC-STATE AAL1979**

MACS AC-STATE AAL1979

AAL1979 B738 (L) 2427 ARR ON TRJ
M/CAS .78-272 MH 243 ALT 34000
X/Y=810.25 / 618.255 LAT/LON=N345549 / N912752
Sp-Brakes 0 GEAR UP FLAPS 0
GEO ZME ATC MX9_998 A/C MX9_998
Holding NOT_HOLDING
inMach=false inAutoSpeed=true flightRules=IFR
_NOT_SET_ (MACS)
NOW 02:39:31.447 FS 02:39:31.447
DESELECT AIRCRAFT

MACS Datalink Controls ACCEPT LOAD REJECT

MACS Datalink Display SEND UPI

MACS Self Spacing Panel AAL1979

Basic Advanced Eurocontrol ASTAR
Remain Merge ERASE Time Distance
LEAD A/C >> MERGE PT >> INTERVAL >>
LEAD PROC >>
NOT EQUIPPED FOR SPACING

MACS Mode Control Panel AAL1979

SPEED MACH 272
SPD SEL VNAV SPACING
UNTIL >> SET >> 272
HEADING 243
HDG SEL LNAV LOC
<LEFT 243 RIGHT>
ALTITUDE 34000 VERTICAL SPEED 0
FLCH VNAV APP VIS
SET >> 34000 SET >> --

MACS FMS Route Panel AAL1979

NEXT WAYPOINT >> LIT
ROUTE MOD
FMS ROUTE >> DIR TO >>
DEPARTURE >> Climb to Cruise Alt
STAR TRANS >> LIT.BYP5 Precision Descend
STAR >> BYP5 Descend via Transition
TRANS >> EMYNJLS17C Descend for landing
APPROACH >> ILS17C
Engage Hold Control Delete
FIX ALT SPD TIM DIS HDG Turn
NONE 14000 230 1.5 N/A 180 Right

MACS MAP AAL1979

NAV ARPT RT WYPT VWR SUA TREC IDS
GS 454 TAS 454 TRK 243 MAG 02:44:37
360/ 0 38.5
AAL1979 IFR
10 20 40 80 160 320

MACS PFD AAL1979

272 HOLD LNAV VNAV ALT 34000
CRUISE
34000
34500
33500
IFR
REF 194
240

MACS CDU AAL1979

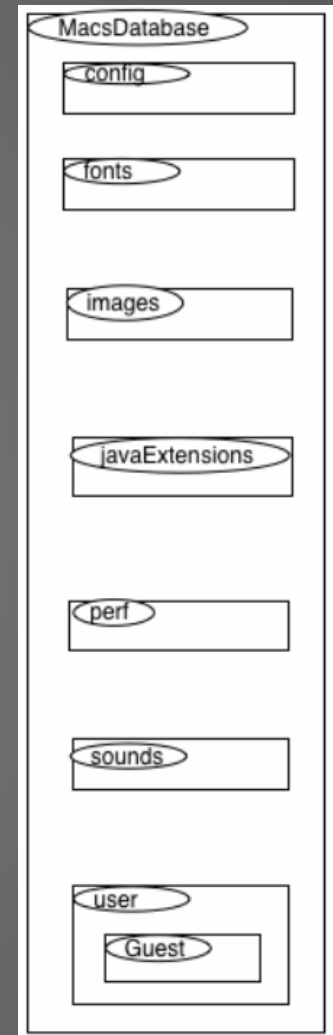
ACTIVE RTE 1 LEGS 1/3
238°/39 NM 272/34000
245°/70 NM 272/34000
MEX00 272/34000
249°/80 NM 272/34000
GLOVE 272/34000
250°/71 NM 260/13000
KARLA 260/13000
251°/70 NM 240/11000
COVIE 240/11000
RTE DATA>
INIT RTE DEF UNAV DATA
FIX LEGS HOLD PROG FMC MSG EXEC
INDEX CLR PROG A B C D E
PREV PAGE NEXT PAGE F G H I J
1 2 3 K L M N O
4 5 6 P Q R S T
7 8 9 U V W X Y
0 % Z < / DEL

Adjusting the Airspace Adaptation

- Pilot *.cfg files: setting rules for pilot ownership

```
NAME          zla_201
.....
RULES         DISPLAY
sector        all
active        yes
playback      no
source        macs
flights       all
status        all
callsign      all
cdti          yes
END_RULES

RULES         CONTROL
sector        ZLA_201
active        yes
```



fms_procedures file

..\MacsAirspace\ZFW_DFW\custom\

```
STAR-TRANS DFW ALL ALL TXK.BYP5 TXK,GLOVE,
STAR-TRANS DFW ALL ALL TUL.BYP5 TUL,LOSZY,
#-----
```

#MASTY TWO (NW)

```
STAR DFW ALL ALL MASTY2
```

#CEDAR CREEK (SE)

```
STAR DFW ALL ALL CQY6
```

#BONHAM FIVE (NE)

```
STAR DFW ALL ALL BYP5
```

#

#-----

```
APP-TRANS DFW DFW17C ALL LEMYN.ILS17C LEMYN,CARBN:AT6000:S210,PENNY:AT5000:S190
```

```
APP-TRANS DFW DFW17C ALL ODEEN.ILS17C ODEEN,BOSSL:AT6000:S210,BOSSI,PENNY:AT5000:S190
```

```
APP-TRANS DFW DFW17C ALL DIETZ.ILS17C DIETZ:AT11000:S240,CARBN:AT6000:S210,PENNY:AT5000:S190
```

#

```
APP DFW DFW17C ALL ILS17C PENNY:AT5000:S190,ZINGG,JIFFY:AT2300:S170,DFW17C:AT562
```

#

MACS FMS Route Panel AAL5409

NEXT WAYPOINT >> **LOA**

ROUTE MOD

FMS ROUTE >>

DEPARTURE >>

STAR TRANS >> **LOA.CQY6**

STAR >> **CQY6**

TRANS >> **DIETZ.ILS17C**

APPROACH >> **ILS17C**

☐ Climb to Cruise Alt

☐ Precision Descend

☐ Descend via Transition

☐ Descend for landing

Engage Hold Control Delete

FIX ALT SPD TIM DIS HDG Turn

NONE 14000 230 1.5 N/A 180 Right

MACS AC Table Editor

File Edit Tools Help 7/0 ☒ Propagate Edits

C:\Users\mkupfer\NASA_SJSU_UARC_work\MACS\Experiments\CMS5\MacsScenari

callsign

route

filedRoute

route/filedRoute ▼

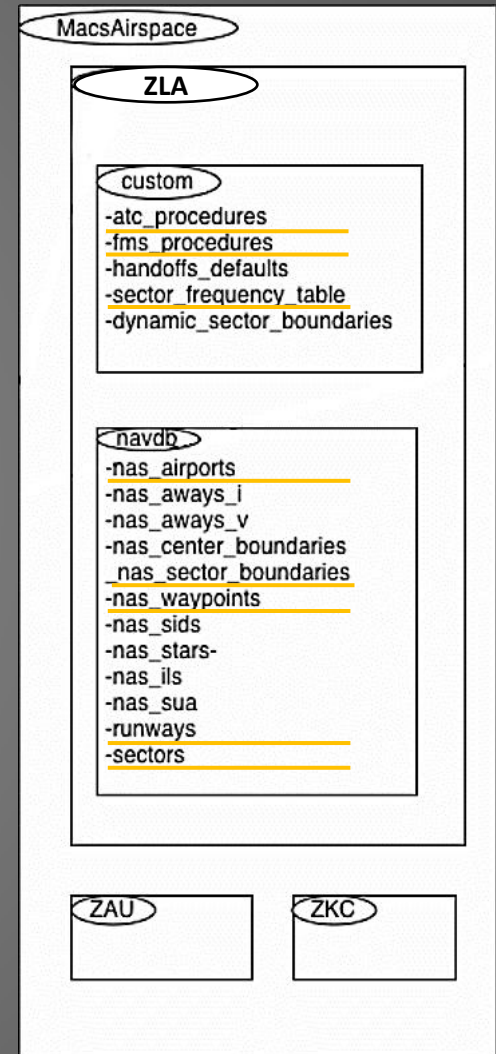
callsign	timeToEnter	filedRoute	route	landingRu
EGF983	120	MSP/.MLC.BYP5.LEMYN.ILS17C.DFW	..MLC.BYP5.LEMYN.ILS17C	DFW17C
DAL237	120	CLT../TUL.BYP5.LEMYN.ILS17C.DFW	..TUL.BYP5.LEMYN.ILS17C	DFW17C
AAL8729	120	TYS../PRX.BYP5.LEMYN.ILS17C.DFW	..PRX.BYP5.LEMYN.ILS17C	DFW17C
TRS883	120	CLT../PRX.BYP5.LEMYN.ILS17C.DFW	..PRX.BYP5.LEMYN.ILS17C	DFW17C
AAL7264	120	OAK../SPS.MASTY2.ODEEN.ILS17C.DFW	..SPS.MASTY2.ODEEN.ILS17C	DFW17C
AAL2439	120	SFO../SPS.MASTY2.ODEEN.ILS17C.DFW	..SPS.MASTY2.ODEEN.ILS17C	DFW17C
EGF6632	120	LAS../TXO.MASTY2.ODEEN.ILS17C.DFW	..TXO.MASTY2.ODEEN.ILS17C	DFW17C

- Used in the traffic scenario to define route / filed route

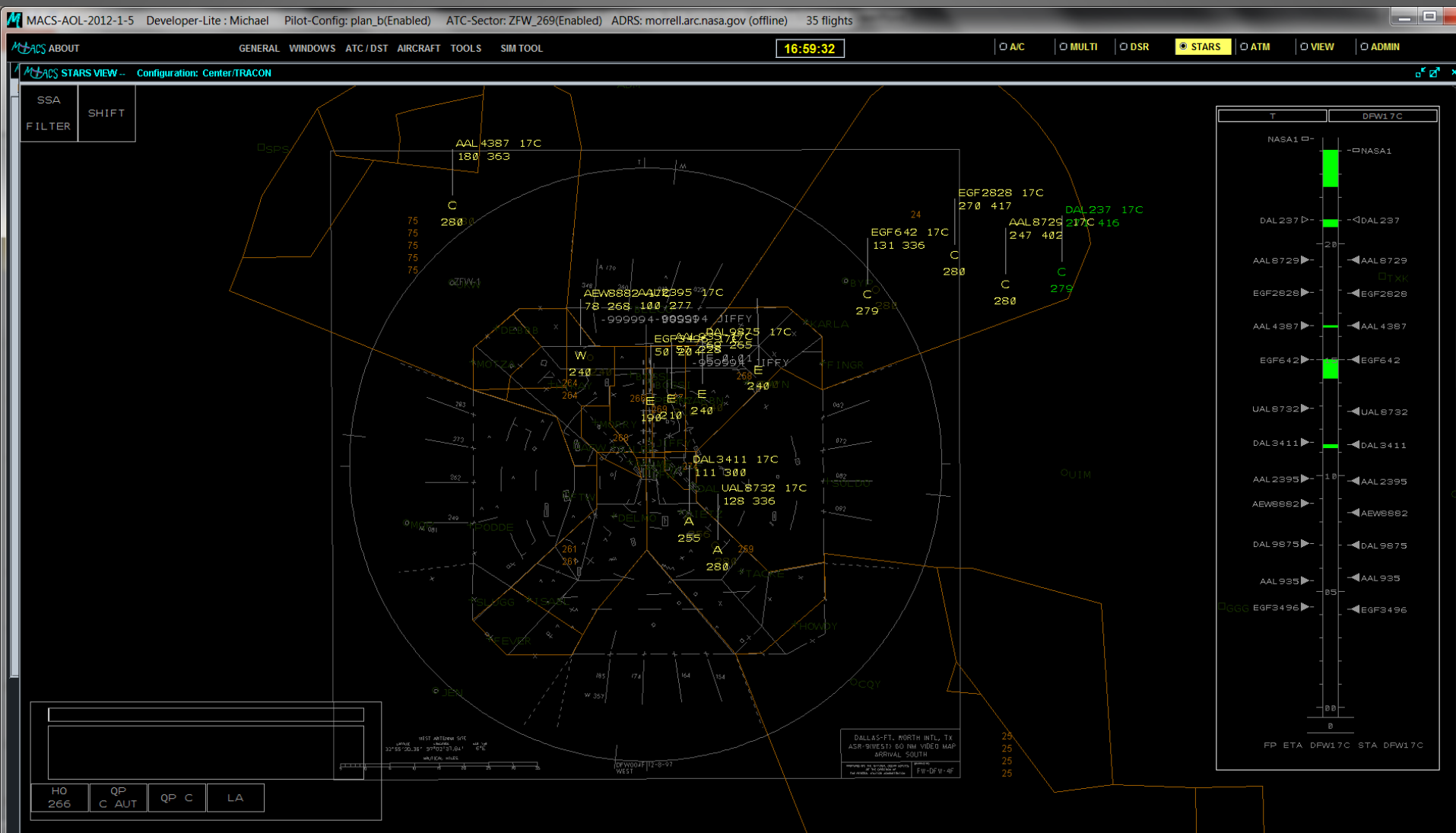
Adjusting the Airspace Adaptation

- sector_frequency_table: setting the radio frequencies

```
#ZLA_37, en route ghost
ZLA_37 127.6
#
#ZLA_201, zuma
ZLA_201 124.5
#
#ZLA_202, stadium
ZLA_202 122.1
#
#ZLA_203, downe
ZLA_203 128.3
```



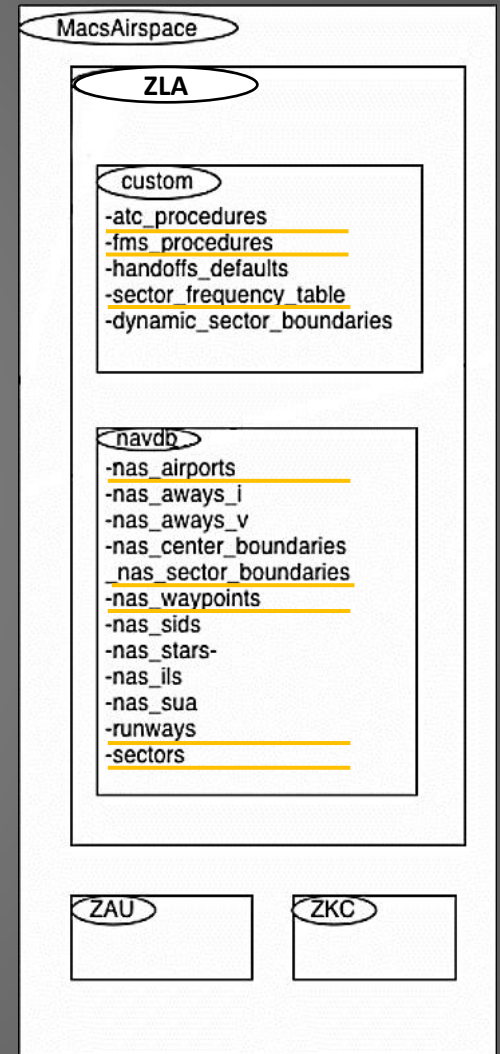
TRACON controllers: STARS display



Adjusting the Airspace Adaptation

- sectors file: set sector name, position symbol, etc.

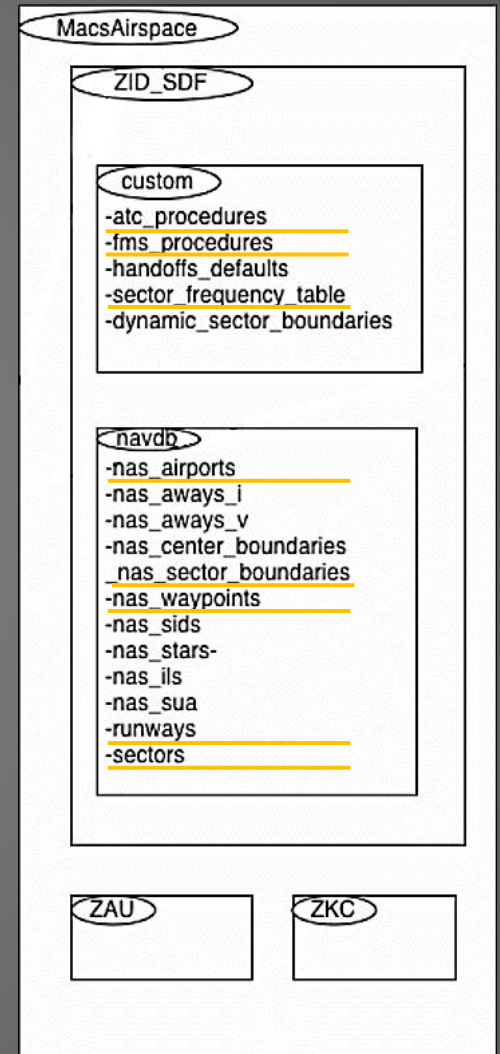
TRACON Sectors									
#num	center_point			radius	arpt	rwyt	video_map	position	position
#	lat	long			file		name	symbol	
#									
201	334445	1182010	50	LAX	all	none.dat	zuma	Z	
202	334445	1182010	50	LAX	all	none.dat	stadium	S	
203	334445	1182010	50	LAX	all	none.dat	downe	D	
204	334445	1182010	50	LAX	all	none.dat	feeder	F	
205	334455	1182010	50	LAX	all	none.dat	feeder_south	U	
206	334445	1182010	50	LAX	all	none.dat	tower	T	
207	334445	1182010	50	LAX	all	none.dat	planner	P	
256	335633	1182429	40	LAX	6L	none.dat	TMC	E	



Adjusting the Airspace Adaptation

- nas_sector_boundaries: defining the perimeter of the sectors

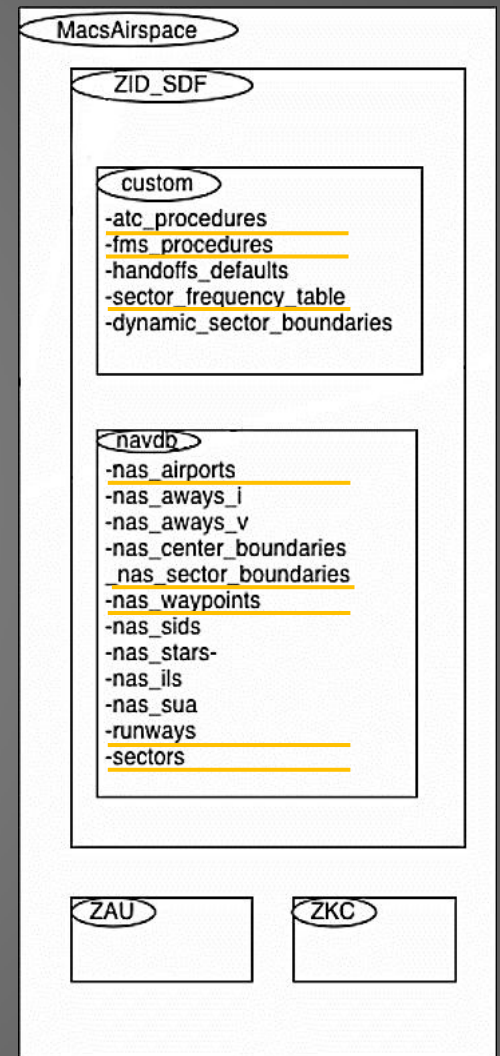
sector	20101
region	include
altitude	070/190
vertex	335426 1182631
vertex	340946 1192439
vertex	341906 1192503
vertex	342954 1185959
vertex	343048 1185019
vertex	340604 1184104
vertex	340559 1182653



Adjusting the Airspace Adaptation

- airports: defining airports and their reference point location

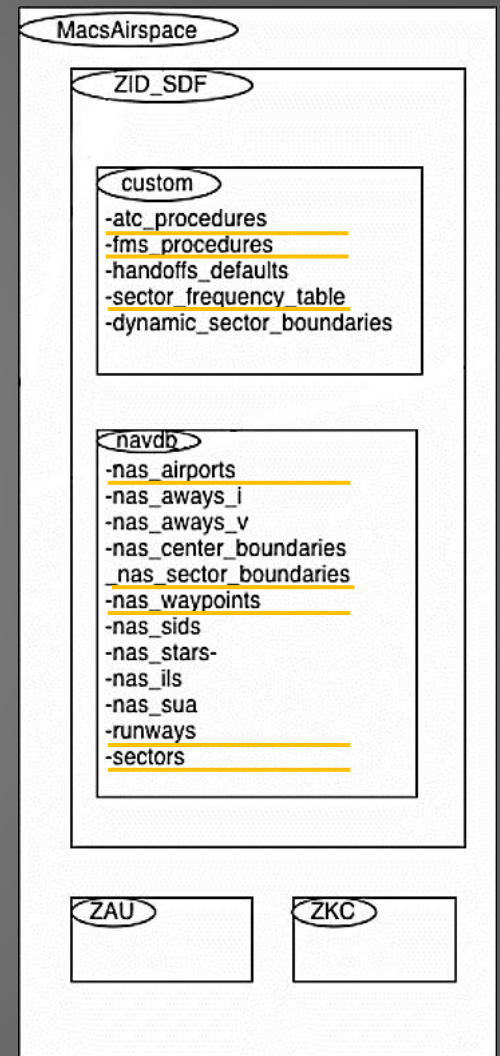
#id	lat	long	elev	loc	
#					
AAA	400931	892006	5	I	
AAS	372130	851834	9	I	
ABE	403908	752625	4	E	
ABEL	332500	1151000	2	I	
ABI	322441	994055	18	I	
ABQ	350225	1063634	54	E	
ABY	313208	841140	1	E	



Adjusting the Airspace Adaptation

- waypoints: defining waypoints and their location

#	name	lat	long	var	elev
1	SHASTA	340427	1181134	0	1
1	GREENE	335952	1181053	0	1
1	BLACKIE	335812	1181335	0	1
1	LASSEN	335829	1181041	0	1



STARS / DSR Waypoints Setup

MACS STARS Waypoint Setup

File Address C:\Users\mkupfer\NASA_SJSU_UARC_work\MACS\Experiments\CMS5\MacsSetup\ZFW.STARS_waypoints

Select categories of waypoints to view

☒ Selected & non-selected ☐ Selected only ☐ NAS only ☐ Non-NAS only ☒ Both

☒ Navaid ☒ Named ☒ Airport ☒ Runway ☒ Gate ☐ Misc

Default settings

Display: Name & symbol Symbol type: Automatic

Font size: 12 Color: (38, 77, 0)

Click name for waypoint details

Select using defaults	Select & customize	Deselect	JIDRI
	Customize	Deselect	IFFY
Select using defaults	Select & customize	Deselect	IFFYP
Select using defaults	Select & customize	Deselect	JIGAR
Select using defaults	Select & customize	Deselect	
Select using defaults	Select & customize	Deselect	
Select using defaults	Select & customize	Deselect	
Select using defaults	Select & customize	Deselect	
Select using defaults	Select & customize	Deselect	

Find a waypoint by typing its name

Clear IFF Select w/ defaults Select & customize

View waypoints starting with letter

<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D	<input type="radio"/> E	<input type="radio"/> F	<input type="radio"/> G	<input type="radio"/> H	<input type="radio"/> I	<input checked="" type="radio"/> J	<input type="radio"/> K	<input type="radio"/> L	<input type="radio"/> M
<input type="radio"/> N	<input type="radio"/> O	<input type="radio"/> P	<input type="radio"/> Q	<input type="radio"/> R	<input type="radio"/> S	<input type="radio"/> T	<input type="radio"/> U	<input type="radio"/> V	<input type="radio"/> W	<input type="radio"/> X	<input type="radio"/> Y	<input type="radio"/> Z
<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9			

- Show / hide waypoints on controller scope
- Customize appearance

Customize IFFY

Display: Name & symbol Symbol type: Automatic

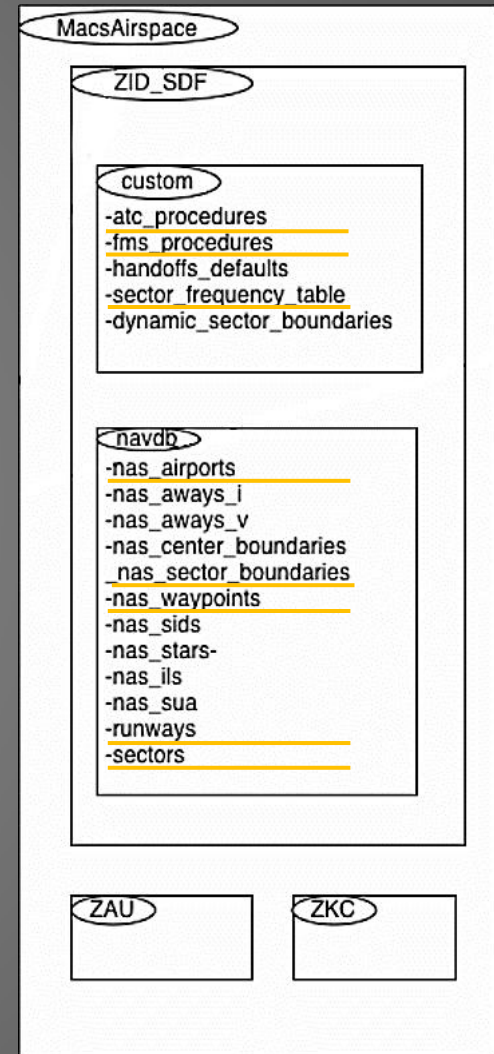
Font size: 12 Color: (38, 77, 0)

Cancel Reset OK

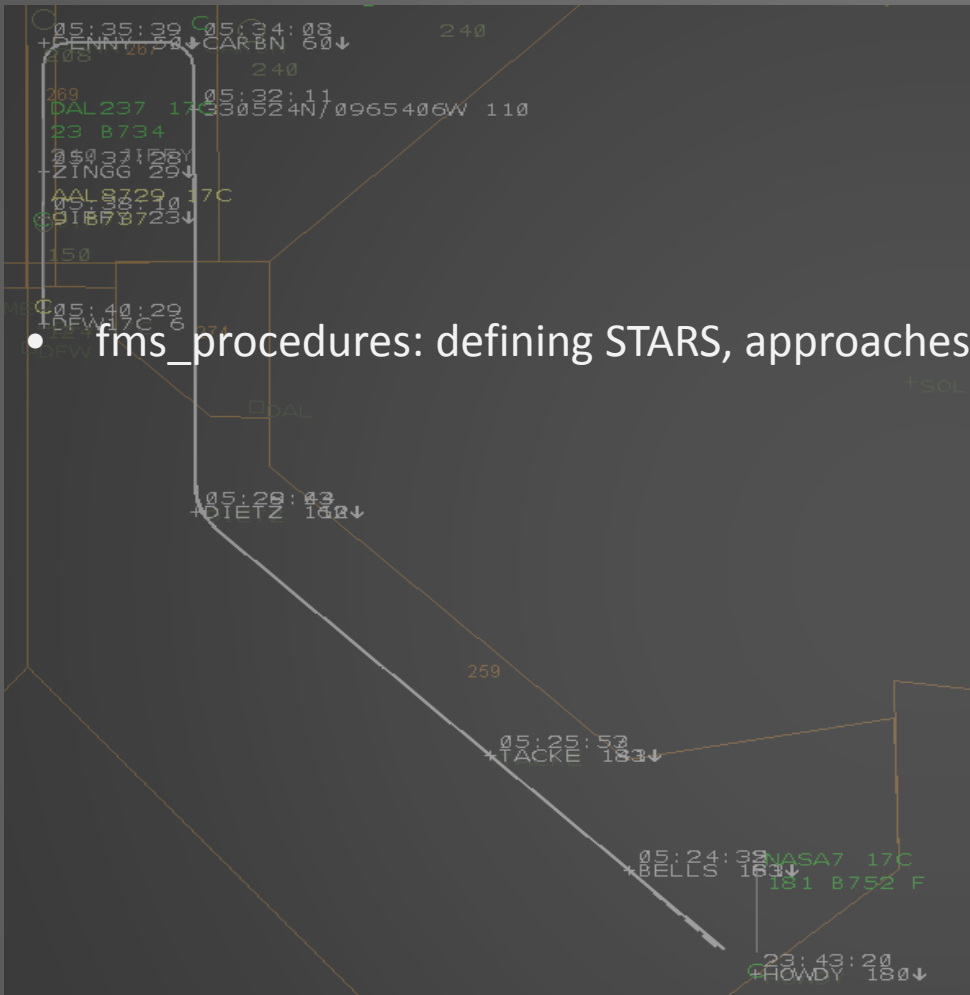
Adjusting the Airspace Adaptation

- runways: defining runways and their reference point location

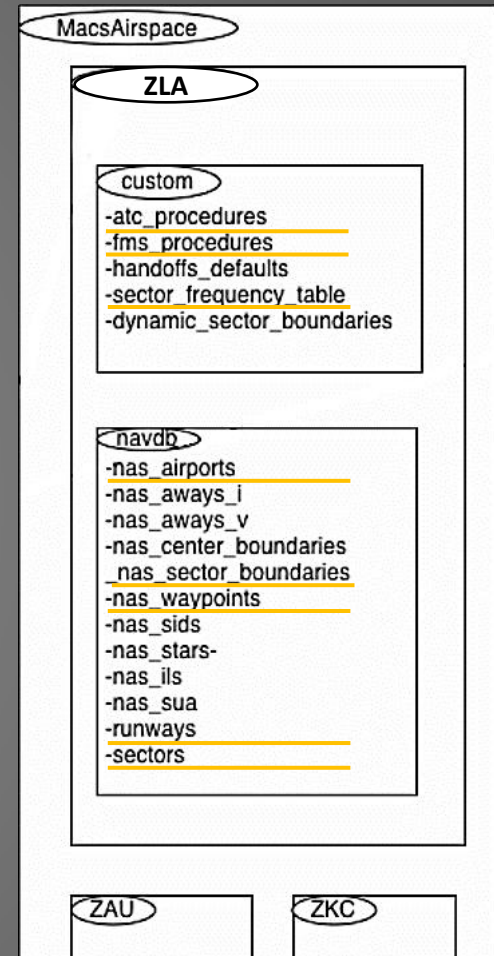
```
runway 24R
waypoint          LAX24R
true_course       264.34
approach_distance  6.41
intercept_altitude 2167
approach_gate      LAX_24R_APCGT
final_approach_fix ROMEN
extended_final     LAX_24R_XFNL
back_of_dump_wpt   LAX_24R_BOD
```



Adjusting the Airspace Adaptation



- `fms_procedures`: defining STARS, approaches, etc.

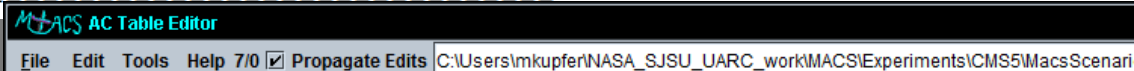


STAR	LAX ALL ALL	RIIVR2	GRAMM:AT17000:S280,RUSTT,RIIVR
STAR	LAX ALL ALL	SEAVU2	KONZL:AT17000:S280,CATAW,SEAVU
STAR	LAX ALL ALL	OLDEE1	LAADY:AT17000:S280,SEAVU
STAR	LAX ALL ALL	SHIVE1	SHIVE:AT15500:S280,MADOW:AT10000:S240,SLI:AT7300:S210
STAR	LAX ALL ALL	SADDE7	SADDE:AT11500:S240,BAYST,CULVE:AT7100:S210
STAR	LAX ALL ALL	LEENA2	SXC:AT17000:S280,CLUSTR,MADOW:AT10000:S240,SLI:AT7300:S210

fms_procedures file

..\MacAirspace\ZFW_DFW\custom\

```
STAR-TRANS   DFW ALL ALL TXK.BYP5      TXK,GLOVE,KARLA:AT13000:S260
STAR-TRANS   DFW ALL ALL TUL.BYP5      TUL,LOSZY,MAMEE,BIRLE,GAATZ,BYP,KARLA:AT13000:S260
#-----
#MASTY TWO (NW)
STAR          DFW ALL ALL              MASTY2              GREGS:AT10000:S240,ODEEN
#CEDAR CREEK (SE)
STAR          DFW ALL ALL              CQY6                HOWDY:AT18000:S280,BELLS,TACKE,DIETZ:AT11000:S240
#BONHAM FIVE (NE)
STAR          DFW ALL ALL              BYP5                KARLA:AT13000:S260,COVIE:AT11000:S240,LEMYN
#-----
#-----
APP-TRANS     DFW DFW17C ALL           LEMYN.ILS17C        LEMYN,CARBON:AT6000:S210,PENNY:AT5000:S190
APP-TRANS     DFW DFW17C ALL           ODEEN.ILS17C        ODEEN,BOSSL:AT6000:S210,BOSSI,PENNY:AT5000:S190
APP-TRANS     DFW DFW17C ALL           DIETZ.ILS17C        DIETZ:AT11000:S240,CARBON:AT6000:S210,PENNY:AT5000:S190
#-----
#-----
APP           DFW DFW17C ALL           ILS17C              PENNY:AT5000:S190,ZINGG,JIFFY:AT2300:S170,DFW17C:AT562
#-----
#-----
```

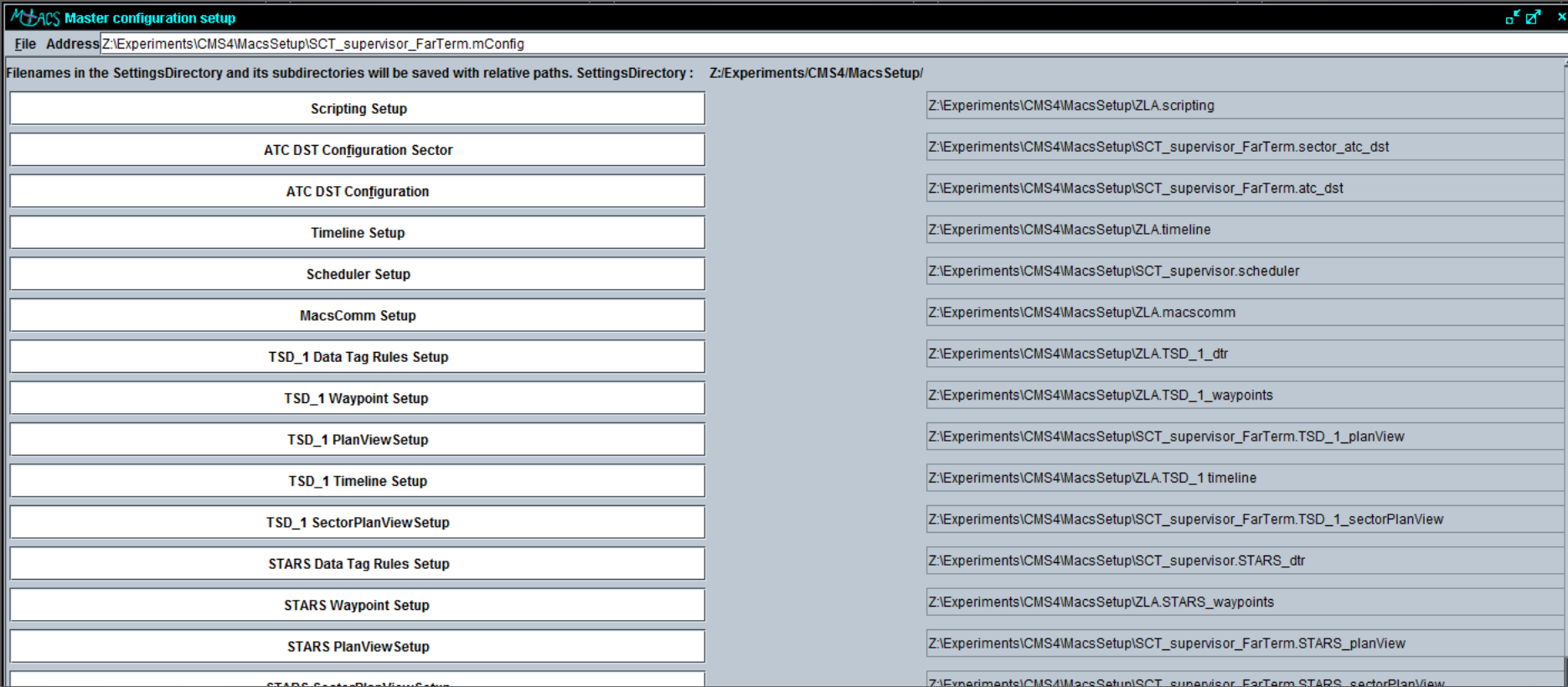


- Used in the traffic scenario to define route / filed route

					callsign
					route
					filedRoute
					route/filedRoute ▾
callsign	timeToEnter	filedRoute		route	landingRu
EGF983	120	MSP/.MLC.BYP5.LEMYN.ILS17C.DFW		..MLC.BYP5.LEMYN.ILS17C	DFW17C
DAL237	120	CLT/.TUL.BYP5.LEMYN.ILS17C.DFW		..TUL.BYP5.LEMYN.ILS17C	DFW17C
AAL8729	120	TYS/.PRX.BYP5.LEMYN.ILS17C.DFW		..PRX.BYP5.LEMYN.ILS17C	DFW17C
TRS883	120	CLT/.PRX.BYP5.LEMYN.ILS17C.DFW		..PRX.BYP5.LEMYN.ILS17C	DFW17C
AAL7264	120	OAK/.SPS.MASTY2.ODEEN.ILS17C.DFW		..SPS.MASTY2.ODEEN.ILS17C	DFW17C
AAL2439	120	SFO/.SPS.MASTY2.ODEEN.ILS17C.DFW		..SPS.MASTY2.ODEEN.ILS17C	DFW17C
EGF6632	120	LAS/.TXO.MASTY2.ODEEN.ILS17C.DFW		..TXO.MASTY2.ODEEN.ILS17C	DFW17C

Master configuration setup

- MACS settings are specified in various setup files
- Master configuration file holds the references to all available setup files
- Individual vs. common setup file (Attention! Setup file edits)



Scripting Setup	Z:\Experiments\CMS4\MacsSetup\ZLA.scripting
ATC DST Configuration Sector	Z:\Experiments\CMS4\MacsSetup\SCT_supervisor_FarTerm.sector_atc_dst
ATC DST Configuration	Z:\Experiments\CMS4\MacsSetup\SCT_supervisor_FarTerm.atc_dst
Timeline Setup	Z:\Experiments\CMS4\MacsSetup\ZLA.timeline
Scheduler Setup	Z:\Experiments\CMS4\MacsSetup\SCT_supervisor.scheduler
MacsComm Setup	Z:\Experiments\CMS4\MacsSetup\ZLA.macscomm
TSD_1 Data Tag Rules Setup	Z:\Experiments\CMS4\MacsSetup\ZLA.TSD_1_dtr
TSD_1 Waypoint Setup	Z:\Experiments\CMS4\MacsSetup\ZLA.TSD_1_waypoints
TSD_1 PlanView Setup	Z:\Experiments\CMS4\MacsSetup\SCT_supervisor_FarTerm.TSD_1_planView
TSD_1 Timeline Setup	Z:\Experiments\CMS4\MacsSetup\ZLA.TSD_1 timeline
TSD_1 SectorPlanView Setup	Z:\Experiments\CMS4\MacsSetup\SCT_supervisor_FarTerm.TSD_1_sectorPlanView
STARS Data Tag Rules Setup	Z:\Experiments\CMS4\MacsSetup\SCT_supervisor.STARS_dtr
STARS Waypoint Setup	Z:\Experiments\CMS4\MacsSetup\ZLA.STARS_waypoints
STARS PlanView Setup	Z:\Experiments\CMS4\MacsSetup\SCT_supervisor_FarTerm.STARS_planView
STARS SectorPlanView Setup	Z:\Experiments\CMS4\MacsSetup\SCT_supervisor_FarTerm.STARS_sectorPlanView

ATC DST Configuration Sector

File Address Z:\Experiments\CMS5\MacsSetup\ZFW_258.sector_atc_dst

Main Ownership Handoff H/O Autonomous Conflict Probe Controller Preference

Single Sector Ownership ☒ Single Sector Ownership ZFW_258

ACTIVE OWNERSHIP ENABLED ☒

Handoff to all sectors you don't own ☐

Handoff Autonomous to all sectors you don't own ☐

Conflict Probe Sync Sectors from Ownership ☐

Main tap

- Set the sector ownership
- Set sector related handoff and conflict probe rules

Other ATC DST Configuration settings

MacS ATC DST Configuration

File Address Z:\Experiments\CMS4\MacsSetup\SCT_supervisor_FarTerm.atc_dst

Conflict Alert Airline Filter Traffic Load Conflict Probe Data Link Sta Freeze Advisories Weather Probe Dynamic Sector

General Settings InActive Ac Participation Combined sectors State Source Traj Filters Handoff H/O Autonomous

ETMS Data Smoothing ☒

AC/State for Computations use DSR outside / STARS inside TRACON

TRACON Radius 100.0 TRACON Ceiling 25000.0

Center TRACON

Tracker Source Selection

Track data source ADSB

Position update Synched at ADSB rate (1s)

Tag value update Synched at ADSB rate (1s)

History Selection

Center radar

Length/number fixed field

Fixed length 3

Spacing/Update rate Synched at Center rate(12s)

TRACON radar

Length/number fixed field

Fixed length 3

Spacing/Update rate Synched at TRACON rate (4.2s)

ADSB

Length/number fixed field

Fixed length 3

Spacing/Update rate Synched at ADSB rate (1s)

Perfect

Length/number fixed field

Fixed length 3

Spacing/Update rate Separately Synched

State Source

- Define the data source for Center/TRACON
- Define settings for history data computation
- Define sync rates

Other ATC DST Configuration settings

MACS ATC DST Configuration

File Address Z:\Experiments\CMS4\MacsSetup\SCT_supervisor_FarTerm.atc_dst

Conflict Alert Airline Filter Traffic Load Conflict Probe Data Link Sta Freeze Advisories Weather Probe Dynamic Sector

General Settings InActive Ac Participation Combined sectors State Source Traj Filters Handoff H/O Autonomous

Accept-handoffs initially ☒

Auto-handoff enabled ☐

Auto-handoff if inside receiving sector ☐

Use 4D trajectory data only (no assigned altitude limits) ☐

Stable conditions time (Seconds) 30.0

Distance to next sector (NM) 30.0

Minimum travel time through next sector (Seconds) 90.0

Wait time after Accept/Retract (Seconds) 60.0

Post handoff time (Seconds) 10.0

Auto-accept handoff enabled ☐

Accept handoff after (Seconds) 30.0

Auto-Accept handoff within (NM) 10.0

Handoff

- Enable/disable auto-handoff
- Define rules for (auto-) handoff (when, where, etc.)

Other ATC DST Configuration settings

MacS ATC DST Configuration

File Address Z:\Experiments\CMS4\MacsSetup\SCT_supervisor_FarTerm.atc_dst

Conflict Alert Airline Filter Traffic Load Conflict Probe Data Link Sta Freeze Advisories Weather Probe Dynamic Sector

General Settings InActive Ac Participation Combined sectors State Source Traj Filters Handoff H/O Autonomous

☐ Enable conflict probe ☐ Enable Manual Trial Planning ☐ Enable conflict resolution (AAC) ☐ Enable TSAFE resolution

☐ External conflict probe (CTAS) ☐ External Trial Planner (CTAS) ☐ External conflict resolver (CTAS)

Managed/Managed	Trial plan/Managed	Managed/Autonomous	Autonomous/Autonomous
Probe Enabled <input type="checkbox"/>	Probe Enabled <input type="checkbox"/>	Probe Enabled <input type="checkbox"/>	Probe Enabled <input type="checkbox"/>
Automatic Resolutions <input type="checkbox"/>	Automatic Resolutions <input type="checkbox"/>	Automatic Resolutions <input type="checkbox"/>	Automatic Resolutions <input type="checkbox"/>
Earliest time for auto-res (sec to LOS) 480	Earliest time for auto-res (sec to LOS) 480	Earliest time for auto-res (sec to LOS) 480	Earliest time for auto-res (sec to LOS) 480
Latest time for auto-res (sec to LOS) 120	Latest time for auto-res (sec to LOS) 120	Latest time for auto-res (sec to LOS) 120	Latest time for auto-res (sec to LOS) 120
AutoResolution Uplink <input type="checkbox"/>	AutoResolution Uplink <input type="checkbox"/>	AutoResolution Uplink <input type="checkbox"/>	AutoResolution Uplink <input type="checkbox"/>
Use AutoExecution Limits <input type="checkbox"/>	Use AutoExecution Limits <input type="checkbox"/>	Use AutoExecution Limits <input type="checkbox"/>	Use AutoExecution Limits <input type="checkbox"/>
AutoExec: Maximum Delay (sec) 60	AutoExec: Maximum Delay (sec) 60	AutoExec: Maximum Delay (sec) 60	AutoExec: Maximum Delay (sec) 60
AutoExec: Maximum Heading Change 31.0	AutoExec: Maximum Heading Change 31.0	AutoExec: Maximum Heading Change 31.0	AutoExec: Maximum Heading Change 31.0
AutoExec: Maximum Altitude Change 2200.0	AutoExec: Maximum Altitude Change 2200.0	AutoExec: Maximum Altitude Change 2200.0	AutoExec: Maximum Altitude Change 2200.0
AutoExec: Maximum Speed Change 50.0	AutoExec: Maximum Speed Change 50.0	AutoExec: Maximum Speed Change 50.0	AutoExec: Maximum Speed Change 50.0
AutoResolution Graphics <input type="checkbox"/>	AutoResolution Graphics <input checked="" type="checkbox"/>	AutoResolution Graphics <input type="checkbox"/>	AutoResolution Graphics <input type="checkbox"/>
AutoApprove requests <input type="checkbox"/>	AutoApprove requests <input type="checkbox"/>	AutoApprove requests <input type="checkbox"/>	AutoApprove requests <input type="checkbox"/>
TSAFE Resolutions <input type="checkbox"/>	TSAFE Resolutions <input type="checkbox"/>	TSAFE Resolutions <input type="checkbox"/>	TSAFE Resolutions <input type="checkbox"/>
Start time for TSAFE res (sec to LOS) 180	Start time for TSAFE res (sec to LOS) 180	Start time for TSAFE res (sec to LOS) 180	Start time for TSAFE res (sec to LOS) 180
Auto TSAFE Uplink <input type="checkbox"/>	Auto TSAFE Uplink <input type="checkbox"/>	Auto TSAFE Uplink <input type="checkbox"/>	Auto TSAFE Uplink <input type="checkbox"/>
Uplink time for TSAFE res (sec to LOS) 120	Uplink time for TSAFE res (sec to LOS) 120	Uplink time for TSAFE res (sec to LOS) 120	Uplink time for TSAFE res (sec to LOS) 120
Auto TSAFE Return to Flight Plan <input type="checkbox"/>	Auto TSAFE Return to Flight Plan <input type="checkbox"/>	Auto TSAFE Return to Flight Plan <input type="checkbox"/>	Auto TSAFE Return to Flight Plan <input type="checkbox"/>
Auto TSAFE Return Owned Only <input type="checkbox"/>	Auto TSAFE Return Owned Only <input type="checkbox"/>	Auto TSAFE Return Owned Only <input type="checkbox"/>	Auto TSAFE Return Owned Only <input type="checkbox"/>
Show if in my sector or if I own one aircraft <input type="checkbox"/>	Show if in my sector or if I own one aircraft <input type="checkbox"/>	Show if in my sector or if I own one aircraft <input type="checkbox"/>	Show if in my sector or if I own one aircraft <input type="checkbox"/>
Show if I don't own either aircraft <input type="checkbox"/>	Show if I don't own either aircraft <input type="checkbox"/>	Show if I don't own either aircraft <input type="checkbox"/>	Show if I don't own either aircraft <input type="checkbox"/>
Minimum Look Ahead Time 1.0	Minimum Look Ahead Time 1.0	Minimum Look Ahead Time 1.0	Minimum Look Ahead Time 1.0
Look Ahead Time / On Route 15.0	Look Ahead Time / On Route 15.0	Look Ahead Time / On Route 15.0	Look Ahead Time / On Route 15.0
Look Ahead Time / Off Route 5.0	Look Ahead Time / Off Route 5.0	Look Ahead Time / Off Route 5.0	Look Ahead Time / Off Route 5.0
Lateral Separation 3.0	Lateral Separation 3.5	Lateral Separation 5.5	Lateral Separation 5.5
Lateral Separation Low Altitude 5.0	Lateral Separation Low Altitude 5.0	Lateral Separation Low Altitude 5.0	Lateral Separation Low Altitude 5.0

Conflict Probe

- Enable/disable different probes/resolution modules
- Set probe and resolution parameters for combination of managed and autonomous aircraft

Other ATC DST Configuration settings

MACS ATC DST Configuration

File Address: C:\Users\lmkupfer\NASA_SJSU_UARC_work\MACS\Experiments\CMS5\MacsSetup\ID10.atc_dst

General Settings | InActive Ac Participation | Combined sectors | State Source | Traj Filters | Handoff | H/O Autonomous | Conflict Alert

☐ Data link enabled

Use Downlinked Intent

☐ VFR ☐ IFR ☐ TFR ☐ AFR

Use ADSB Intent in Conflict Probin

☐ VFR ☐ IFR ☐ TFR ☐ AFR

Uplink Settings

☒ Eligibility required

Seconds to first Trial plan Turn: 90

☐ Over ride lack of DL equipage

Seconds to Turn for data link uplink: 1800

☐ Limited Datalink Uplink to downstream changes

☐ Uplink CMS speed advisory to non-FIM AC ☐ Uplink CMS speed advisory to FIM AC

TOC Mode: OFF

☒ Use arrival message for RTA

RTA Mode IFR: OFF

RTA Mode AFR: OFF

Timeout Settings

Timeout period: 40

Transfer period: 6

Positive Response Timeout period: 6

Display Settings

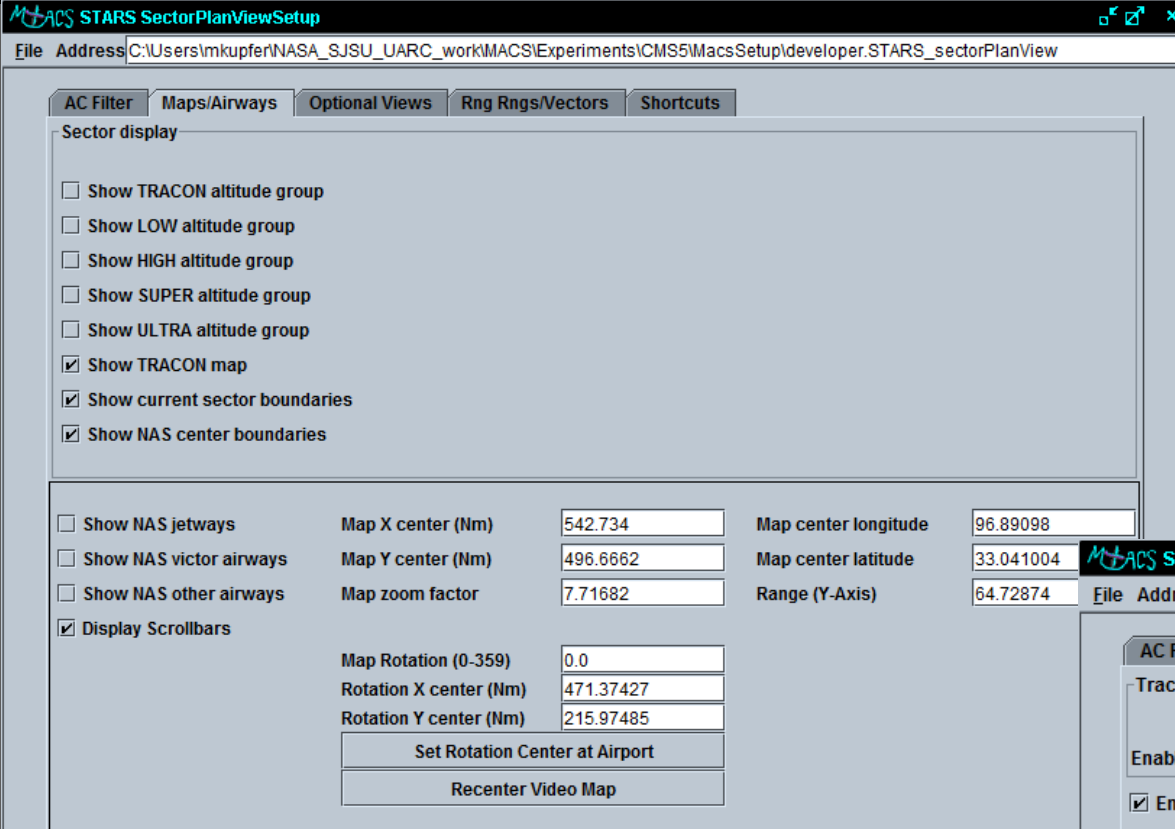
Use PlanViewSetupWindow to control display of datalink views (menu text, status list, and banner)

Menu text

Enabled	Referent	Text	Return type
<input checked="" type="checkbox"/>	M1	CHECK STUCK MIC	BOG UNA SPY

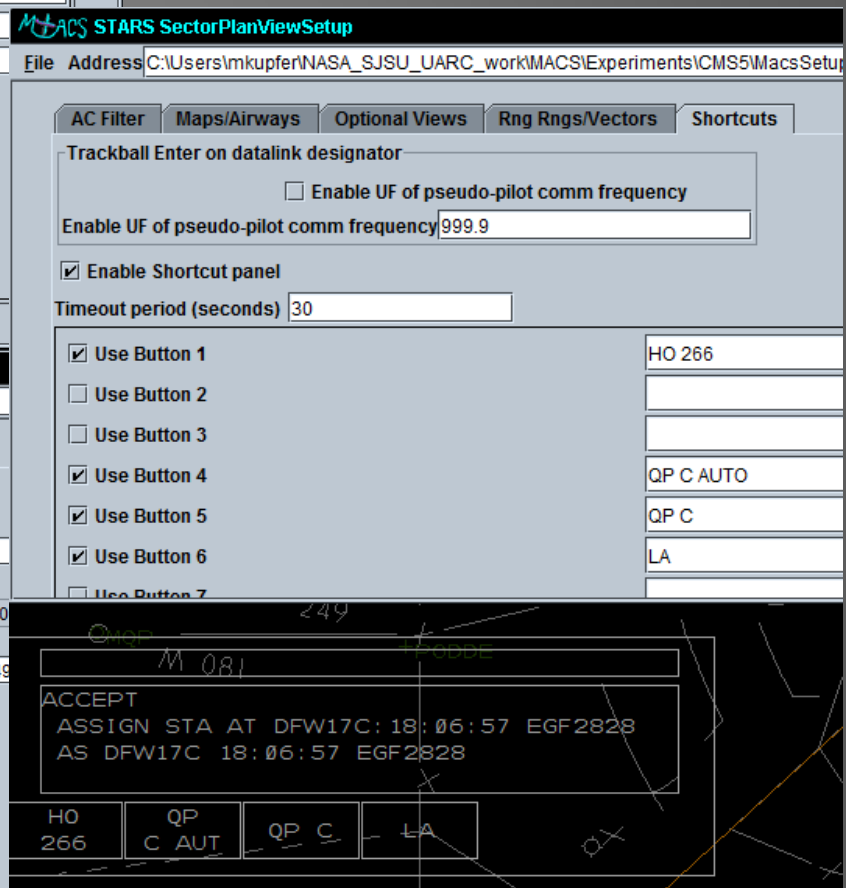
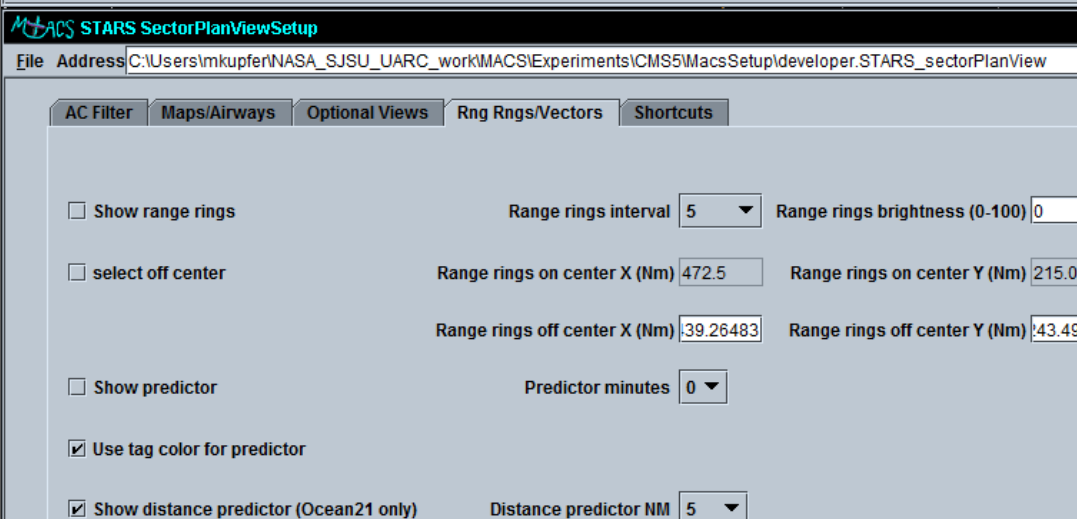
Data Link

- Enable/disable DL
- Define requirements and parameters
- Transfer of Communication (TOC)



STARS / DSR SectorPlanView Setup

- Modify appearance of scope



Some other STARS / DSR PlanView Setup taps

MACS STARS PlanViewSetup

File Address C:\Users\mkupfer\NASA_SJSU_UARC_work\MACS\Experiments\CMS5\MacsSetupID10_supervisor

Colors Fonts Mode Feedback Sector Display Mouse/Keyboard/DAK ATC Specific Options

Mouse/Pointer Assignments

left button Pick

middle button Enter

right button Enter

Pointer interaction Drag

☒ Pan enabled

☒ Snap-To TrialPlan Waypoint enabled

Snap To Waypoint Dist (pix) 24

Pick Range Pix 30

Keyboard Mapping

☒ PC mapping ☐ FAA mapping (Keyboard before 2005)

☐ FAA mapping (Keyboard 2005 and later) ☐ FAA mapping (PC via USB)

☐ (Cortron) USB Keyboard ☐ ARTS (Orbit) USB Keyboard

Button Scheme

☒ Original AOL DSR Scheme

MACS STARS PlanViewSetup

File Address C:\Users\mkupfer\NASA_SJSU_UARC_work\MACS\Experiments\CMS5\MacsSetupID10_supervisor\STARS_planView

Colors Fonts Mode Feedback Sector Display Mouse/Keyboard/DAK ATC Specific Options D

Selected aircraft color

Predictor color

Dwelled aircraft color

View text color

Current sector color

Handoff flash off color

High sector color

Tracon sector color

NAS other airways color

NAS jetways color

Trial planning route color

Downlinked route proposal color

STARS Data Tag Rules Setup

MACS STARS Data Tag Rules Setup

File Edit Address C:\Users\mkupfer\NASA_SJSU_UARC_work\MACS\Experiments\ICMS5\MacsSetup\cms5.STARS_dtr

Copy from limited Copy from expanded

default tag position NORTH

show main data tag ☒

lines in main data tag 3

Line 1, number of fields 3

Line 2, number of fields 7

Line 3, number of fields 1

show tag line at ac position ☐

Callsign Blank Field (1 Char) Reported Runway

Current Altitude Handoff Sector Symbol Ground Speed 1000 Blank Field (1 Char) Heavy Designator (H)

Type of Aircraft 1000

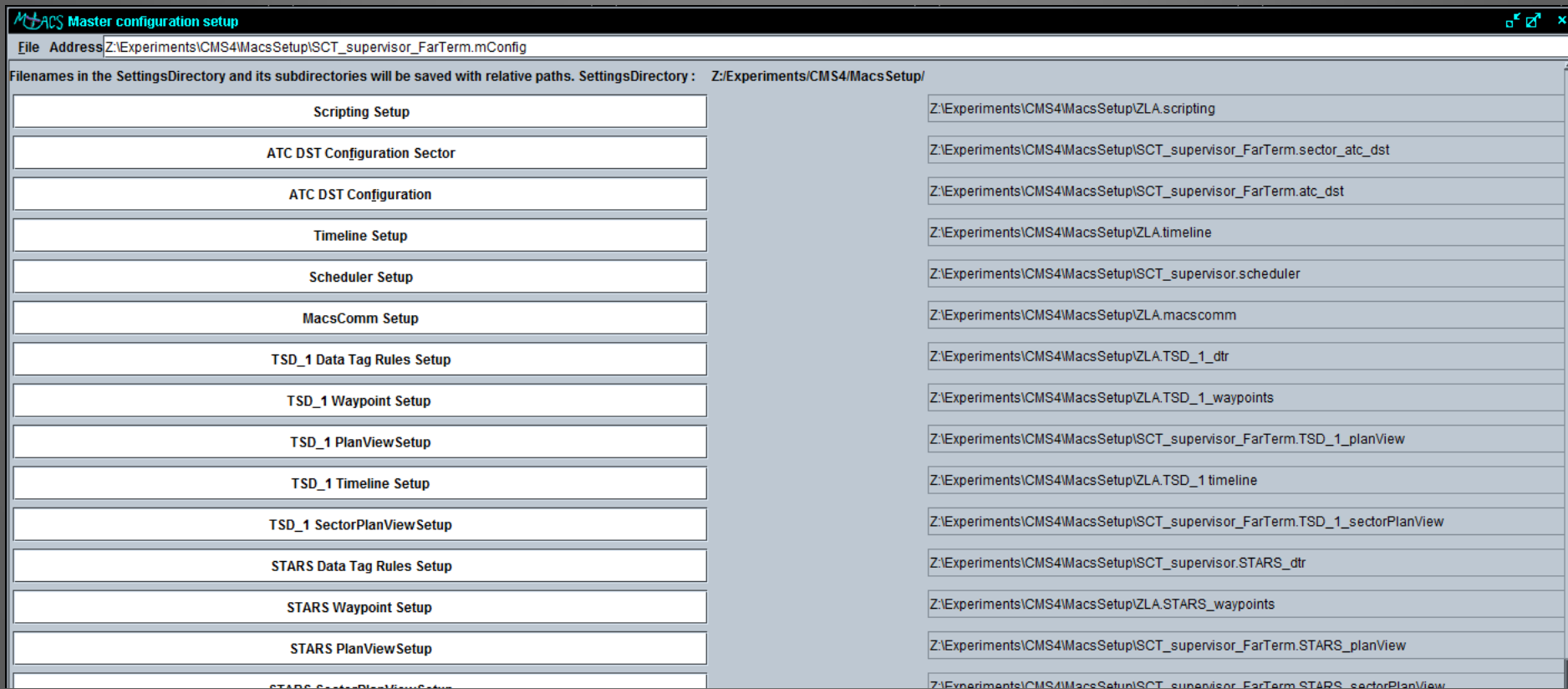
NextNAS Advisory

Name	Filter	TagRules	TagLayout	TagColor	TagAppearance	TagItemColor	TagItemAppearance	AcPositionTag	Symbol	History	SymbolColor	SymbolFlash	LeaderLine	TimelineColors
default		default	default		default	default	default	default	?	default		default	default	
owned														

- Design the appearance of the data tags in the STARS display
- Use filters to create rules for different sub-groups of aircraft
- Set the correct priority of rules in the list
- More information:
<https://aol1.arc.nasa.gov:8443/display/macs/MACS+Questions+and+Answers>

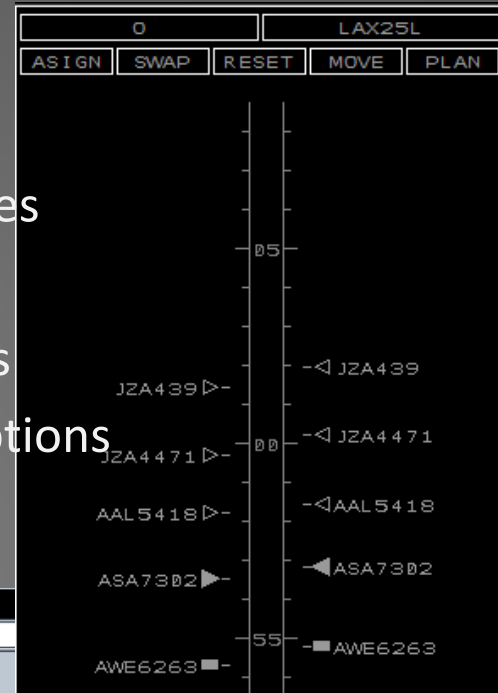
CMS tools → review Master configuration setup

- Settings are specified in various setup files
- Master configuration file holds the references to all available setup files
- Individual vs. common setup file (Attention! Setup file edits)



CMS tools: Timelines

- STARS / DSR timeline setup → setup and configure timelines
- Scheduler setup → define schedulers used by timelines
- ATC DST Configuration → ETA/STA tab → STA freeze settings
- STARS / DSR_1 SectorPlanView Setup → Define display options



MacS STARS Timeline Setup

File Edit Address Z:\Experiments\MacsSetup\ZLA STARS_timeline

Slack slop (sec) 4

Overlap slop (sec) 4

timeline	length (min)	gap (min)	ownedOnly	pixPerMin	crossOver	showSlack	showOverlap	assign	swap	reset	move	plan	L arType	L scheduler	L acFilter	R arType	R scheduler	R acFilter
LAX24R	25	0	false	35	LAX24R	true	true	false	false	false	false	false	FLIGHT_PLAN_ETA	NONE	FROM	SCHEDULE_STA	LAX24R	FROM
LAX25L	25	0	false	35	LAX25L	true	true	false	false	false	false	false	FLIGHT_PLAN_ETA	NONE	FROM	SCHEDULE_STA	LAX25L	FROM
CULVE	20	0	false	35	CULVE	false	true	false	false	false	false	false	FLIGHT_PLAN_ETA	NONE	FROM	SCHEDULE_STA	CULVE	FROM
SLI	20	0	false	35	SLI	false	true	false	false	false	false	false	FLIGHT_PLAN_ETA	NONE	FROM	SCHEDULE_STA	SLI	FROM
FUELR	20	0	false	35	FUELR	false	true	false	false	false	false	false	FLIGHT_PLAN_ETA	NONE	FROM	SCHEDULE_STA	FUELR	FROM
PALAC	20	0	false	35	PALAC	false	true	false	false	false	false	false	FLIGHT_PLAN_ETA	NONE	FROM	SCHEDULE_STA	PALAC	FROM
SAN27	60	0	false	10	SAN27	true	true	false	false	false	false	false	FLIGHT_PLAN_ETA	NONE	FROM	SCHEDULE_STA	SAN27	FROM

meter list	maxLines	ownedOnly	crossOver	etaType	staType	scheduler	delayDisplayOptions	acFilter	item	item	item	item	item	item	item

Timeline Setup:

- Define timelines and meter lists
 - ETA/STA types
 - Appearance
 - Filters

L arType	L scheduler	L
FLIGHT_PLAN_ETA	NONE	TO*
FLIGHT_PLAN_ETA	NONE	TO*
FLIGHT_PLAN_ETA	NONE	TO*
FLIGHT_PLAN_ETA	NOMINAL_ETA	
FLIGHT_PLAN_ETA	FLIGHT_PLAN_ETA	
FLIGHT_PLAN_ETA	CURRENT_ETA	
FLIGHT_PLAN_ETA	DIRECT_TO_ETA	
FLIGHT_PLAN_ETA	DATA_LINKED_ETA	
FLIGHT_PLAN_ETA	CTAS_ETA	
FLIGHT_PLAN_ETA	CTAS_STA	
FLIGHT_PLAN_ETA	SCHEDULE_STA	

CMS tools: Slot markers

STARS / DSR Plan View Setup → Tools tab

STARS PlanViewSetup

File Address Z:\Experiments\CMS4\MacsSetup\ZLA_201_FarTerm.STARS_planView

Colors Fonts Mode Feedback Sector Display Mouse/Keyboard/DAK ATC Specific Options DataTag Popup Views Ac to Display Target/History Tools Weather

Flight plan/Halo display Spacing circles

Slot Markers

- ☒ Show slot markers for all aircraft
- ☐ Show slot markers for controlled aircraft
- ☒ Show slot markers for dwelled aircraft
- ☐ Show slot marker after handoff

Timeout after Handoff (sec) 10

Timeout for all Slots (sec) 10

☒ Time Based Radius 7.5

☐ Show ground speed on slot markers

☒ Enable Altitude Filter (ft) 0

20000

- Enable/ disable slot markers
- Set various parameters i.e., altitude filters, radius, etc.

Slot Markers

- ☒ Show slot markers for all aircraft
- ☐ Show slot markers for controlled aircraft
- ☒ Show slot markers for dwelled aircraft
- ☐ Show slot marker after handoff

Timeout after Handoff (sec) 10

Timeout for all Slots (sec) 10

☒ Time Based Radius 7.5

☐ Show ground speed on slot markers

☒ Enable Altitude Filter (ft) 0

20000

CMS tools: Speed Advisories

ATC DST Configuration → Advisories tab

MTACS ATC DST Configuration
File Address: Z:\Experiments\CMS4MacSetup\ZLA_201_FarTerm.atc_dst

Conflict Alert | Airline Filter | Traffic Load | Conflict Probe | Data Link | Sta Freeze | **Advisories** | Weather Probe | Dynamic Sector

General Settings | InActive Ac Participation | Combined sectors | State Source | Traj Filters | Handoff | H/O Autonomous

4D Trajectory Logic

LOGIC TYPE: SPEEDS_FOR_NOMINAL_OPD Tactical Speeds to join Nominal Optimal Profile Descents

Enabled ☒

STA assignment required ☒

Min secs ac must be late to show advisory or late time: 1

Min secs ac must be late to compute advisory: 5

Minimum Altitude to be included: 2200.0

ASTAR use dynamic (FMS active) trajectory ☐

Use Next Schedule Point only for Speed Advisory ☒

speed advisories enabled ☒

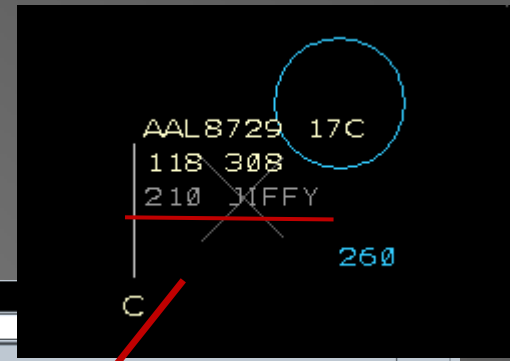
Early/Late indication enabled ☒

Min secs ac must be early to show advisory or early time: 1

Min secs ac must be early to compute advisory: 5

Maximum Altitude to be included: 25000.0

ASTAR use ATC procedures ☐



Advisories

- Enable/disable Speed Advisories, Early/Late indicators
- Set parameters for when advisories are displayed
 - STA required
 - Bounds for ETA-STA error
 - Altitude bounds
 - Schedule point

MTACS Mode Control Panel AAL8729

SPEED ☐ MACH ☒ SPD SEL ☐ VNAV ☐ SPACING

UNTIL >> JIFFY SET >> 210

HEADING ☐ HDG SEL ☒ LNAV

<LEFT 218

Minimum Altitude to be included: 1000.0

ASTAR use dynamic (FMS active) trajectory ☐

Use Next Schedule Point only for Speed Advisory ☒

Spacing cones

STARS / DSR Plan View Setup → Tools tab

MacOS STARS PlanViewSetup

File Address Z:\Experiments\CMS4\MacsSetup\ZLA_201_FarTerm.STARS_planView

Colors Fonts Mode Feedback Sector Display Mouse/Keyboard/DAK ATC Specific Options DataTag Popup Views Ac to Display Target/History Tools Weather

Flight plan/Halo display

default

Default look ahead

Default time 20

symbol

Symbol

Symbol size

Spacing circles

all aircraft

dwelled aircraft

Cones

- ☒ Base cone length on runway scheduler
- ☐ Base cone length on next merge point scheduler
- ☐ Base cone length on lead aircraft

pulse predictors

☐ Show pulse predictor

Pulse symbol NONE

Pulse symbol size 6

Pulse time interval (secs) 30

Halos/Jrings

☒ Show radius value when showing halo/jring

Cones

- ☒ Base cone length on runway scheduler
- ☐ Base cone length on next merge point scheduler
- ☐ Base cone length on lead aircraft

Slot Markers

☒ Show slot markers for all aircraft

☐ Show slot markers for controlled aircraft

Timeout after Handoff (sec) 10

Timeout for all Slots (sec) 10

☒ Time Based Radius 7.5

☐ Show ground speed on slot markers

☒ Enable Altitude Filter (ft) 20000

☒ Show slot markers for dwelled aircraft

☐ Show slot marker after handoff

☒ Show indicated air speed on slot markers

Examples Controller Stations: Center controller (DSR)

MACS-AOL-2012-1-5 Developer-Lite: Michael Pilot-Config: plan_b(Enabled) ATC-Sector: ZFW_269(Enabled) ADRS: morrell.arc.nasa.gov (offline) 0 flights

MACS ABOUT GENERAL WINDOWS ATC/DST AIRCRAFT TOOLS SIM TOOL 02:13:08 AC MULTI DSR STARS ATM VIEW ADMIN

MACS DSR_1 ATC VIEW Configuration: Center/TRACON

269 SN 269
0523 23 13.4 NM1/IN

133.5

NASA7→
320-181
R033 364

NASA8→
320-215
R034 382

UAL648→
360-334
R020 461

AAL2338→
320C
R010 456

25
25
25
25

T METERLIST DFW17C

AAL8729	05:23:50	00:00
DAL237	05:25:35	-00:07
NASA1	05:28:36	-00:30
NASA2	05:30:24	-00:09
NASA3	05:32:12	+00:39
NASA4	05:34:00	-00:07
NASA5	05:35:48	+00:12
NASA6	05:38:05	-00:01
NASA7	05:40:28	00:00
NASA8	05:42:19	00:00

T RANGE -

100 400 700 1000

100

T		DC	
FILTER	FDB FIELDS	HIST VECTOR	BRIGHT VOLUME
HOST	NO H/E SYNC	DATA LINK	ALL

T CRD KEYS CODE

RA MWL

MC READY

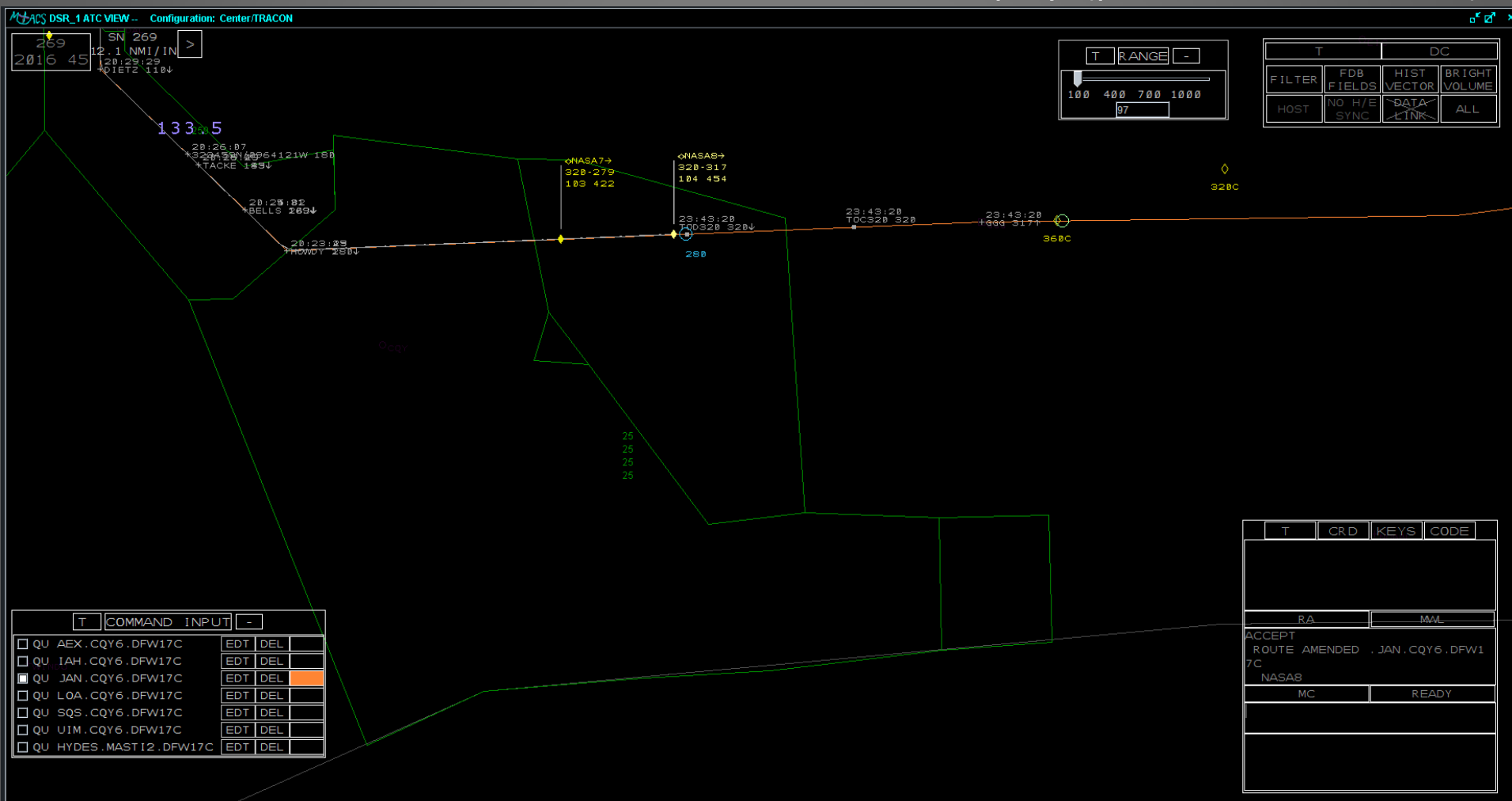
T COMMAND INPUT -

<input type="checkbox"/>	QU AEX.CQY6.DFW17C	EDT	DEL	
<input type="checkbox"/>	QU IAH.CQY6.DFW17C	EDT	DEL	
<input type="checkbox"/>	QU JAN.CQY6.DFW17C	EDT	DEL	
<input type="checkbox"/>	QU LOA.CQY6.DFW17C	EDT	DEL	
<input type="checkbox"/>	QU SQS.CQY6.DFW17C	EDT	DEL	
<input type="checkbox"/>	QU UIM.CQY6.DFW17C	EDT	DEL	

Assign atc_procedures to ASTOR aircraft

- QU <name of atc_procedure> <callsign>
- Command input panel provides shortcuts
- Preview and color coding function

DSR display (possible in STARS, too)



Adjusting the Airspace Adaptation

- atc_procedures: defining atc routes

MacAirspace

ZLA

custom

-atc_procedures
-fms_procedures
-handoffs_defaults
-sector_frequency_table
-dynamic_sector_boundaries

navdb

-nas_airports
-nas_aways_i
-nas_aways_v
-nas_center_boundaries
-nas_sector_boundaries
-nas_waypoints
-nas_sids
-nas_stars
-nas_ils
-nas_sua

```
#####
#TYPE      AIRPORT RWY ENTRYFIX  TYPE  Name                      DescentCas  Range  Waypoints and Restrictions
#####
#
#LAX24R
ARRIVAL    LAX      LAX24R  HEC    JET    HEC.RIIVR2.LAX24R  300    200    HEC, GRAMM:AT17000:S280, RUSTT, RIIVR, M
ARRIVAL    LAX      LAX24R  PGS    JET    PGS.RIIVR2.LAX24R  300    200    PGS, GRAMM:AT17000:S280, RUSTT, RIIVR, M
ARRIVAL    LAX      LAX24R  TNP    JET    TNP.SEAVU2.LAX24R  300    200    PKE, TNP, IPHIW, KONZL:AT17000:S280, C
ARRIVAL    LAX      LAX24R  JLI    JET    JLI.OLDEE1.LAX24R  300    200    HIIHO, JLI, LAADY:AT17000:S280, SEAVU, M
ARRIVAL    LAX      LAX24R  AVE    JET    AVE.SADDE7.LAX24R  300    200    AVE, REYES, PIRUE:AT18000:S280, FIM, SA
ARRIVAL    LAX      LAX24R  RZS    JET    RZS.SADDE7.LAX24R  300    200    RZS, DEANO:AT20000:S280, VTU, SADDE:AT
```

KC

atc_procedures file

..\MacAirspace\ZFW_DFW\custom\

TUL,LOSZY,MAMEE,BIRLE,GAATZ,BYP,KARLA:AT13000:S260,COVIE:AT11000:S240,
LEMYN,CARBN:AT6000:S210,PENNY:AT5000:S190,ZINGG,JIFFY:AT2300:S170,
DFW17C:AT562

ARRIVAL	DFW	DFW17C	MLC	JET	MLC.BYP5.DFW17C	280	200	MLC,KARLA:AT13000:S260,COVIE:
ARRIVAL	DFW	DFW17C	PRX	JET	PRX.BYP5.DFW17C	280	200	PRX,KARLA:AT13000:S260,COVIE:
ARRIVAL	DFW	DFW17C	TUL	JET	TUL.BYP5.DFW17C	280	200	TUL,LOSZY,MAMEE,BIRLE,GAATZ,B
#								
ARRIVAL	DFW	DFW17C	HYDES	JET	HYDES.MASTY2.DFW17C	280	200	HYDES,CHARE,SEANN,MARDY,M
ARRIVAL	DFW	DFW17C	IRW	JET	IRW.MASTY2.DFW17C	280	200	IRW,MOOSE,GREGS:AT10000:S240,

- Used by cms tools
- Assign atc_procedure to ASTOR aircraft to get slot marker (QU command)

Data Collection Setup

- Define which data collection items will be logged and in which frequency
- Data output directory is defined in Scenario Control

MACS Data Collection Setup

File Address: C:\Users\mkupfer\NASA_SJSU_UARC_work\MACS\Experiments\CMS5\MacsSetup\ATC.dataCollection

Control ATC State log Custom log

Notes on Data Collection

Data Collection Items can be turned on and off on this panel. Several events can be customized from here. Not all data collection items are available in all operator modes. Greyed out items are not available in the mode you are currently running. Data collection files are typically opened and closed when a simulation is started and stopped unless you check 'Keep Data Collection Running'.

The data collection files can be found in: C:\Users\mkupfer\NASA_SJSU_UARC_work\MACS\Experiments\TestOutp

Data Collection Main Mode

☒ Start/Stop Data Collection when MACS Simulation start/stops ☐ Keep Data Collection Running

General Use Data Collection Items

☒ Flight State (periodic) ☒ include nominal data ☒ include flight plan FlightState log rate (seconds): 1 Max Limit of Aircraft: 35 File: MORRELL_Macs_FlightState_plan_b_YYYY-MM-DD_HH-MM-SS.log

☒ Customized Events File: MORRELL_Macs_Custom_plan_b_YYYY-MM-DD_HH-MM-SS.log

Flight Deck Data Collection Items

☐ Pilot Inputs and Flight Deck Events File: MORRELL_Macs_Pilot_plan_b_YYYY-MM-DD_HH-MM-SS.log

☐ FMS Trajectories File: MORRELL_Macs_Traj_plan_b_YYYY-MM-DD_HH-MM-SS.log

Air Traffic Control Data Collection Items

☒ Controller Inputs and ATC events File: MORRELL_Macs_Atc_plan_b_YYYY-MM-DD_HH-MM-SS.log

☒ ATC State items (sector counts,etc.) File: MORRELL_Macs_AtcState_plan_b_YYYY-MM-DD_HH-MM-SS.log

☒ ATC trajectory predictions (periodic) Trajectory log rate (seconds): 60 File: MORRELL_Macs_AtcTraj_plan_b_YYYY-MM-DD_HH-MM-SS.log

☒ ATC Trajectory Modifications (trial plans) File: MORRELL_Macs_TrajMod_plan_b_YYYY-MM-DD_HH-MM-SS.log

☐ ATC Reported Trajectory File: MORRELL_Macs_AtcReported_plan_b_YYYY-MM-DD_HH-MM-SS.log

MACS Data Collection Setup

File Address: C:\Users\mkupfer\NASA_SJSU_UARC_work\MACS\Experiments\CMS5\MacsSetup\ATC.dataCollection

Control ATC State log Custom log

☐ recordConflictAlert (NOTE: dependent on settings in Conflict Alert tab of ATC DST Configuration setup window)

☒ recordSeparationViolation (NOTE: dependent on settings in Conflict Alert tab of ATC DST Configuration setup window)

☒ recordSectorCount

☐ recordConflictProbe (NOTE: dependent on settings in Conflict Probe tab of ATC DST Configuration setup window)

Meter fix crossing Waypoint crossing Runway crossing Distance/time flown

☒ log runway crossing

Runway search list

Waypoint in runway search list: DFW17C

Add runway Remove selected runway

Questions and Answers

Contact:

Michael Kupfer

michael.kupfer@nasa.gov

(650)-604-4624

Simulation Supervision

During simulation possible tasks may be:

- Modify controller displays (colors of tools, datablock layout, etc., bring up timelines)
- Restart station
 - Wrong shortcut loaded initially
 - Problems with displays
- Real time flight monitoring (XY Trajectory Panel)
- Assist pseudo pilots
- Delete aircraft

Real Time Control Panels

- Real Time AC Editing (duplicate, modify non-initialized, or delete aircraft)

MADS Real Time AC Editing

File Edit Help 1/1 NoAircraftAtAll.txt

Execute Changes

Never Mind

execute all changes made since starting edit during the simulation or the last revert

Prepare to add copies of selected ac to simulation with modified time of entry

Search

callsign	timeToEnter	atcType	type	departureAi...	departureR...	destination...	landingRun...	filedRoute	route	startPointN...	targetWayp...	heading
AAL5418	0	B738	B738	TUS	NOT_SET	LAX	LAX25L	TUS/J..MZB...	..PEBLE.SH...	324538N/1...	MZB	277.591

- Real Time AC Display: prepare to delete aircraft)

MADS RealTime AC Display

File Edit Help 7/1 NoAircraftAtAll.txt

Prepare to add copies of selected ac to simulation with modified time of entry

Prepare to modify an ac in the simulation

Prepare to delete ac from simulation

Select All Ac

Add to Selection with Rules

Fire Propagate Rules on Selected Ac

Select ac with AcFilter ...

allsign route Route te

Search

call	timeToEnter	atcType	type	departureAi...	departureR...	destination...	landingRun...	filedRoute	route	startPointN...	targetWayp...	headingTar...	trueHeading	latitu
AAL54	0	B732	B732	BOS	NOT_SET	LAX	LAX25L	TUS/J..MZB...	..PEBLE.SH...	324538N/1...	MZB	277.59177	276.18268	32.760
AFL69	0	B732	B732	BOS	NOT_SET	LAX	LAX25L	EWJ/J..MZ...	..PEBLE.S...	330246N/1...	PEBLE	307.6556	308.5556	33.046
ASA73	0	B732	B732	BOS	NOT_SET	LAX	LAX25L	ORD/J..HE...	..GRAMM.R...	342711N/1...	GRAMM	220.96292	218.17125	34.453
AWE6205	0	B732	B732	BOS	NOT_SET	LAX	LAX25L	BOS/J..TNP...	..KONZL.S...	335833N/1...	CATAW	268.81537	264.72162	33.975
DAL3771	0	B763	B763	JFK	NOT_SET	LAX	LAX25L	JFK/J..TNP...	..CATAW.S...	335622N/1...	CATAW	267.75137	264.85236	33.939
JZA439	0	CRJ7	CRJ7	SLC	NOT_SET	LAX	LAX25L	SLC/J..HEC...	..GRAMM.R...	345210N/1...	HEC	202.69965	209.56631	34.869
JZA4471	0	CRJ7	CRJ7	SLC	NOT_SET	LAX	LAX25L	SLC/J..HEC...	..GRAMM.R...	344209N/1...	GRAMM	216.68239	218.17128	34.702

- From flight deck view ...
- Switch to STARS display and let them click a bit (dwelling over a/c, bring up route, move datablock, ...)
- Go over CMS tools
 - Point out Master config file and that besides other functions and features, CMS tools can be turned on/off + parameters from various setup files within MACS
 - Timeline
 - Go through functions in GUI, meterlist
 - Walk through timeline setup (maybe modify/add a timeline), how to bring up a TL, sector specific setup
 - Scheduler setup, atc dst setup: sta freeze
 - Slot markers
 - Stars plan view setup (see how settings change what happens on the cope)
 - Speed advisories and E/L indicators
 - Atc DST Config
 - Show how pilots would enter such a clearance in MACS
 - Cones
- Talk about fms- and atc procedures (bring up respective files)
- Talk about other atc/dst configuration tabs: state source, data link, conflict probe, handoff (go back to STARS/flight deck and show HO)
- Show how to change Datablock, waypoints, scope appearance
- Talk about other functions in STARS planview setup (colors, mouse/keyboard, ...)
- Data collection setup
- Scenario Control (bundles, traffic file, winds, data directory, ...)
- Switch to DSR
- Go over how to assign ATC route to an (ASTOR) aircraft
- Point out DSR/STARS similarities (data tag rules display, waypoints, etc)
- Point out sectors file (sectors file: set sector name, position symbol, etc.)